

AGS Studies Report

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Subject Tune and Chromaticity Correction

Observations and Conclusion

At three points in the cycle we have measured tunes as a function of radius for the following cases:

- a. bare machine
- b. programs in the horizontal and vertical quad strings as suggested in Studies Report No. 182
- c. with the quads and the horizontal sextupoles programmed to reduce the horizontal chromaticity

In all cases the skew quads were powered in such a way that coupling between the two transverse planes was at a minimum. At the highest momentum point, the 60 A available was inadequate.

Coherent oscillations were excited by the tune meter kickers. The tune was measured by filtering of PUE signals in the MCR and feeding these signals into a gated frequency counter (we tuned the filter such that we measured the lower side band frequency of the coherent oscillation).

The results are summarized in Tables 1, 2 and 3. The tunes given are for zero radius as indicated by the PUE system.

Table 4 gives the value of the currents in the different strings at the three measuring points.

Table 1  
(@ 35,000 GC)

	Bare Machine a	Quads b	Quads + Sext c
$\nu_H$	8.70	8.662	8.692
$\nu_V$	8.752	8.795	8.782
$\xi_H$	-2.34	-2.34	-1.15
$\xi_V$	-0.24	-0.24	-0.78

Table 2  
(@ 45,000 GC)

	Bare Machine a	Quads b	Quads + Sext c
$\nu_H$	8.688	8.650	8.696
$\nu_V$	8.746	8.799	8.779
$\xi_H$	-2.61	-2.54	-0.49
$\xi_V$	+0.06	+0.05	-0.78

Table 3  
(@ 55,000 GC)

	Bare Machine a	Quads b	Quads + Sext c
$v_H$	8.648	8.577	8.627
$v_V$	8.714	8.815	8.785
$\xi_H$	-3.36	-3.37	-1.17
$\xi_V$	+0.94	+1.01	-0.12

Table 4

	35,000 GC	45,000 GC	55,000 GC
$I_H$ Quad (A)	15	20	42
$I_V$ Quad (A)	25	43	100
$I_{Sext}$ (A)	130	280	390
$I_{Skews}$ (A)	37.5	50	60

### Conclusions

The results for the bare machine are in agreement with previous measurements (see Studies Report No. 182).

We are able to control the chromaticity to values of about 1 throughout the cycle in both planes by using the horizontal sextupole string only.

The quads have been programmed in such a way that the vertical tune was approximately 8.78 throughout the cycle. The program for the horizontal quad string does not seem optimal yet, because we are crossing  $\nu_H = 8-2/3$  between 45,000 and 55,000 Gauss Counts, while the intention was to hold the tune above the  $8-2/3$  line.

mvh